

An understanding of B2B Innovation Adoption Models

Raechel Hughes, University of Canberra
Bruce Perrott, University of Technology, Sydney

Abstract

Technology has altered the way businesses operate in all contexts. Within a Business-to-Business (B2B) context, technology has changed the way products are ordered, dispatched, and paid for. Furthermore, technology has had profound influences on services, and has altered the way services are delivered (Bitner, Ostrom and Meuter, 2002), particularly with the increased use of self-service technologies (SSTs). There is limited research on the use of SSTs in a B2B context. To this end, this paper will provide an overview to some of the literature pertaining to E-Business in a B2B context, with an overview of various models of B2B Innovation Adoption.

E-Business in a B2B context

Businesses are increasingly using technology in their business-to-business operations, and as a result, it is important to understand the impact of these technologies on the relationship, business processes and productivity. Trust is widely researched in business-to-business relationships due to its high importance and the fragile nature of B2B relationships (Harris and Dibben, 1999). Another area that has been investigated in great detail is how technology can be utilised in a business-to-business context (Berthon, Lane, Pitt and Watson, 1998), however there has been limited discussion on technological innovations and B2B relationships, particularly in relation to services, rather than physical goods.

Businesses need to have effective e-business systems, as they are regarded as keys to technological innovation (Jackson and Harris, 2003). From a B2B perspective, these effective e-business systems can reduce costs and enhance current relationships (Zhuang and Lederer, 2003). The systems can also improve efficiency and effectiveness (Perrott, 2003), enhancing a business' brand and business practices a great deal. In order to implement e-business strategies in a B2B context, existing models must be transformed (Barnes and Hunt, 2001), altering current ways of doing business. Electronic business has cost benefits, advantages in the market, and value adding. Furthermore, competitive pressures may drive an organisation to utilise electronic business (Perrott, 2005). The development of Internet usage has involved transformations particularly in the area of "expectations amongst companies with regard to value creation within a supply chain" (Baroncelli and Adami, 2003).

Due to all the benefits of introducing technology in a B2B context, the use of the Internet in B2B practices is indeed growing. Forrester Research estimates that overall, 90 percent of e-commerce will be generated from the B2B sector, rather than the Business to Consumer (B2C) Sector (Reedy, Schullo and Zimmerman, 2000). In fact, there is a growing trend for some companies to refuse to operate with those not using web facilities in their operations (Reedy, et al, 2000), indicating the importance of having web facilities in a business-to-business relationship. Organisations are

demanding a more effective management of their distribution through using the Internet to assist in ordering stock control and communication. Implementing Information Technology in a business tends to change the value chain from one that is linear to one that is a value network (Carignani and Mandelli, 1999; cited in Baroncelli and Adami, 2003). This allows businesses to extend their relationships with customers, suppliers, retailers, brokers, co-producers, employees and shareholders, and have a more personalised relationship with them (Kandampully, 2003), the ultimate goal of e-business strategies.

Organisational values have been found to impact on trust in business-to-business relationships (Harris and Dibben, 1999). Trust can be established through shared interactions over time (Young and Wilkinson, 1989), and is vital to establishing and maintaining B2B relationships. From a service perspective, trust is essential as a way of reducing perceived risk. Trust also impacts on the choice of technology use in a B2B context. The internetalisation framework indicates the internal and external factors of an organisation operating as an e business. This model also examines the various characteristics that may impact on technology use. This model is included below (refer fig 1).

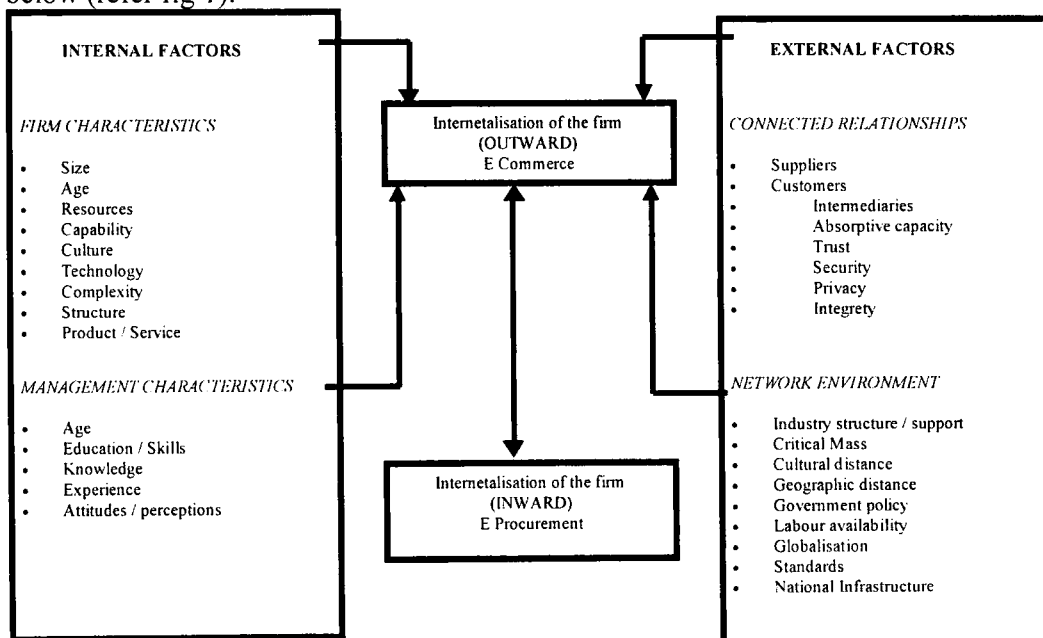


Figure One: characteristics that might impact on technology use

Source: Buttriss and Wilkinson (2003)

Innovation Adoption

The concept of innovation diffusion

In order to understand business adoption of technology, particularly SSTs, it is important to have an understanding of innovation diffusion and adoption. Innovation diffusion has been studied from a marketing perspective for many years. Innovations tend to be considered as a new idea, or product that is introduced. Rogers (2003) has investigated innovation diffusion from the perspective of how people adopt products or services. This has been adapted in many studies in marketing. Diffusion can be

explained as the process by which an idea or product that is perceived as new is accepted by the market (Brown, 1981). Similarly, adoption is a process one goes through when faced with a new product, but unlike diffusion, it is the process an individual goes through, compared with the process of a market (Dodgson and Bessant 1996).

The concept of Innovations and Perceived Risk

Innovations can be defined in a number of ways – however, generally, if an idea, practice or object is perceived as new to an individual, it can be considered an innovation (Lockett and Littler, 1997). Risk is where the future outcome is known, and a probability for each possible outcome can be determined (Byrne, 2005) and this increases when innovations are introduced. Perceived risk arises when there is a possibility of adverse consequences if a purchase is made, or not made. It also arises where there are uncertain buying goals, and where several products can match the goals of the consumer (Cox, 1967). Further research from investment literature indicates that risk perception and expected benefits can be balanced (Sitkin and Weingart, 1995 and Byrne, 2005) – in other words if a benefit is perceived over the possible risk, it is likely that the product will be adopted. Byrne (2005) suggests risk can be categorised as upside risk (potential for good returns); downside risk (potential for loss); volatility (returns varying over time) and feelings (uncertainty). Whilst these constructs are used for investments, attitude toward perceived risk could include upside and downside risk, and feelings for any non-visible product.

Innovation adoption states that consumers go through five stages: awareness; interest; evaluation; trial; adoption (Rogers, 2003). Particular characteristics of innovations can make some products more likely to be adopted than others. The limitations of this model are limitations that are relevant to this paper – 1) the model focuses primarily on B2C adoption, and does not consider B2B adoption and 2) the model focuses primarily on the adoption of a physical good, rather than a service. As a result, other models of innovation adoption, particularly those focused on a B2B context need to be addressed.

Innovation adoption in organisations

While Rogers' work is most commonly cited in innovation adoption, its emphasis on consumer adoption is evident. As businesses are increasingly adopting technologies, it is important to have an understanding of organisational innovation adoption, something that is little known. Some models will now be discussed.

Within the information systems (IS) literature, Davis, Bagozzi and Warshaw's (1989) Technology Acceptance Model (TAM) has been most important as a way of discussing how technological systems are utilised within an organisational context (Ting, Dubelaar and Dawson, 2005). This model indicates that external variables of perceived usefulness and perceived ease of use will influence the attitude towards use; behavioural intention and, ultimately, actual system use (Davis, et al, 1989). This model highlights a different construct from Rogers' model (2003), in that Davis et al (1989) examines acceptance, while Rogers (2003) looks at adoption. These terms imply differences in behaviour and perception; however, the models do not seem to indicate any behavioural differences.

It is also apparent that Rogers' (1995) work is very well used within marketing. Rogers himself has extended a model applied to organisations. He focuses on the importance of managerial attitude and innovativeness, expanding his own previous work for a B2B context. Rogers (1995) extends his model to a six-stage model for the adoption of innovations in organisational contexts, which is appropriate for this paper. These stages include: agenda setting; matching; decision; redefining/restructuring; clarifying; routinising.

Lakhanpal (1994) believes four categories influence innovation adoption in organisations. These are: individual factors; organisation factors; environmental factors and innovation characteristics. Key elements predicting organisation adoption are: Managerial intervention; Subjective norms; Facilitating conditions; Secondary adoption process; Assimilation and Consequences (Gallivan, 2001).

Furthermore, Frambach and Schillewaert, 2002 provide a Framework of organisational innovation adoption. This is indicated in figure two.

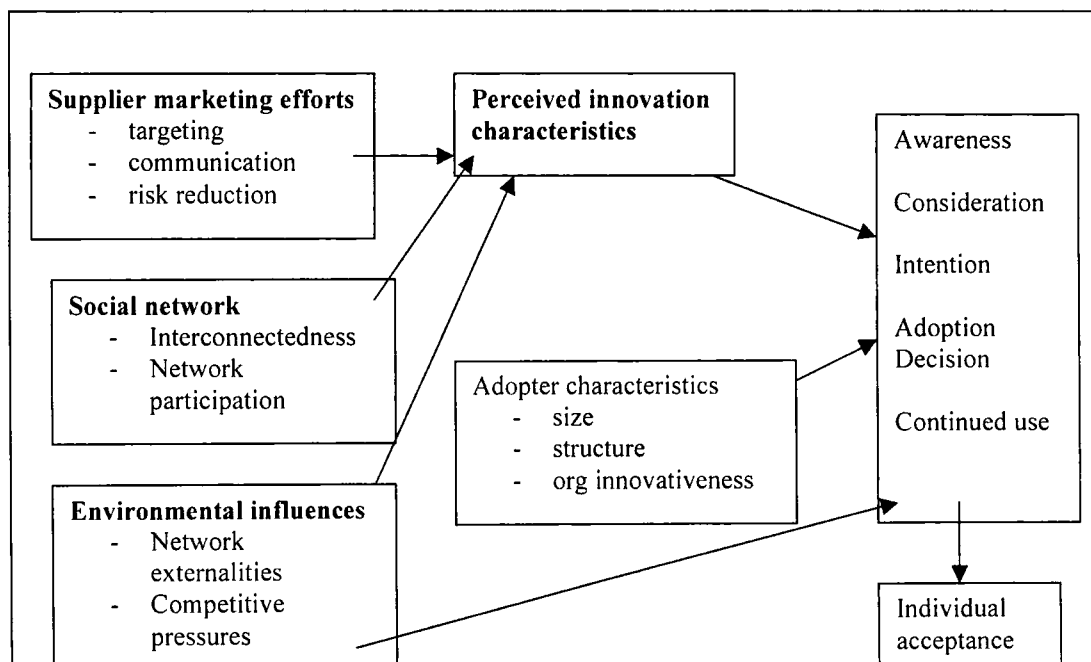


Figure two: Framework of Organisational Innovation Adoption
Source: Frambach and Schillewaert, 2002

To further this model, the authors (Frambach and Schillewaert, 2002) have provided a framework of individual innovation acceptance, once it has reached the individual acceptance stage, above. They are particularly interested in the individual's attitude towards innovation, usage of the innovation by peers, and organisational factors, such as staff training. This model indicates the pattern of behaviour when an innovation is introduced to an organisation – that is, not only must the organisation accept the innovation; individuals within the organisations also must accept this innovation. This is reinforced by other literature, as previously discussed (Zaltman, Duncan and Holbeck, 1973; Leonard Barton and Deschamps, 1988; Gallivan, 2001).

A new model of innovation adoption in a B2B Context

It is evident that a number of models of organisation adoption of technologies are present, however none relate to the use of technology in particular contexts, therefore a new model is proposed. As Rogers (1995) and Davis (et al, 1989) are the most commonly used models, these models will make the basis of the conceptual model, with variables coming from other work, such as Frambach and Schillewaert, 2002. These existing models are agreed to be valid contributions to understanding innovation adoption within organisations. This model is included below.

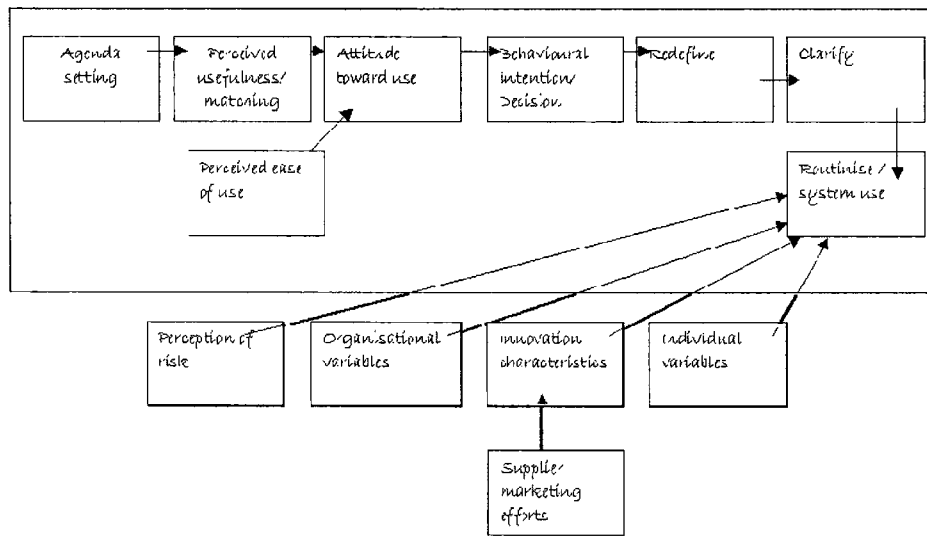


Figure Three: Proposed B2B Model of Technology Adoption and Acceptance
 Developed using Rogers (1995); Frambach and Schillewaert (2002) and Davis et al (1989)

Summary

The literature relating to innovation adoption has long been applied to marketing research, however it is generally only applicable in a B2C context. It also relates to physical goods, rather than services. Through analysing a lot of models that have been proposed, the authors of this paper have proposed a new model of B2B Innovation Adoption, from a service perspective. Further research, to be carried out by the authors, will test this model in a services context, particularly within the context of SSTs.

As organisation adoption of innovation increases, it is essential to have a greater understanding of how and why organisations adopt new technologies. Through analysing the literature, it is believed that in addition to a process of adoption, factors such as perception or risk, organisational variables, innovation characteristics and individual variables all factor in on both the organisation's decision to adopt, and individuals within the organisations decision to use. Issues such as acceptance and adoption need distinction. This is something that will be carried out in further research.

Further research also needs to examine the roles played in organisational development – for instance, who makes decisions within an organisational context (key staff members) and also the importance of the organisational decision vs. the individual staff members' decisions. This has been discussed to some degree in the literature, however, visibility plays a key role, which is not the case in terms of SSTs.

Exciting times lie ahead in organisational innovation adoption. It is essential to understand business buying behaviour, and this paper is one step toward understanding various B2B Innovation models.

Reference List

- Alderson, W., and Cox, R., 1948, Towards a Theory in Marketing, Journal Of Marketing, October
- Alderson, W., 1954, Problem Solving and Marketing Science, The Charles Coolidge Parlin Memorial Lecture
- Barnes, S., and Hunt, B., 2001, E Commerce and V Business, Business Models for Global Success, Butterworth-Heinemann, Oxford, Great Britain
- Baroncelli, A., and Adami, R., 2003, E Business and the evolution of the supply chain in the spirits industry: a comparison between Italian and Nordic markets, 19th IMP-conference, Switzerland
- Berthon, P., Lane, N., Pitt, L., Watson, R., 1998, The World Wide Web as an industrial marketing communication tool: Models for the identification and assessment of opportunities, Journal of Marketing Management, Volume 14
- Bitner, M., Ostrom, A., Meuter, M., 2002, Implementing successful self-service technologies, Academy of Management Executive, Nov 2002, Vol 16, Issue 4
- Brown, L., 1981, Innovation diffusion: A new perspective, New York, Methuen
- Business Week, 2005, Top 20 Innovative Companies in the World, Business Week, August 8-15, 2005
- Byrne, D., 2005, How do consumers evaluate risk in financial products, Journal of Financial Services Marketing, Vol 10, No 1
- Buttriss, G., and Wilkinson, I., 2003, Towards a Process Model of Internetalisation: Becoming an e Business, 19th IMP Conference, Switzerland
- Cox, D., 1967, Risk handling in consumer behaviour: An intensive study of two cases, in Cox, D (Ed), Risk Taking and Information Handling in Consumer Behaviour, Graduate School of Business Administration, Harvard University, Boston
- Davis, F., Bagozzi, R., and Warshaw, P., 1989, User acceptance of computer technology: a comparison of two theoretical models, Management Science, Vol 35, No 8
- Dodgson, M., and Bessant, J., 1996, Effective Innovation Policy: A New Approach, International Thompson Business Press, London
- Frambach, R., and Schillewaert, N., 2002, Organisation Innovation Adoption: A Multi-Level Framework of determinants and opportunities for future research, Journal of Business Research 55 (2)

Gallivan, M.J., 2001, Organisational Adoption and Assimilation of Complex Technological Innovations: Development and Application of a New Framework, *The Data Base for Advances in Information Systems*, 32 (3)

Harris, S., and Dibben, M., 1999, Trust and Co-operation in business relationship development: Exploring the influence of national values, *Journal of Marketing Management*, Issue 15

Jackson, P., and Harris, L., 2003, E Business and organisational change, *Journal of Organizational Change Management*, 16 (5)

Kandampully, J., 2003, *B2B Relationships and networks in the Internet Age*, Management Decision, London

Lakhanpal, B., 1994, Assessing the factors related to microcomputer usage by middle managers, *international Journal of Information Management*, Vol 14, No 1

Leonard Barton, D., and Deschamps, I., 1998, Managerial Influence in the implementation of new Technology, *Management Science*: 14

Lockett, A. and Littler, D., 1997, The Adoption of Direct Banking Services, *Journal of Marketing Management*, Vol.13

Perrott, B., 2003, Efficiency and Effectiveness Dimensions from the impact of e-business, An exploratory view, Working Paper 1/03 School of Marketing, University of Technology, Sydney

Perrott, B., 2005, Towards a Manager's Model for e-Business Strategy Decisions, *Journal of General Management*, Summer 2005

Reedy, J., Schullo, S., and Zimmerman, K., 2000, *Electronic Marketing*, The Dryden Press, USA

Rogers, E., 2003, *Diffusion of Innovations*, Fourth Edition, The Free Press

Sitkin, S., and Weingart, L., 1995, Determinants of risky decision-making behaviour: A test of the mediating role of risk perceptions and propensity, *Academy of Management Journal*, Vol 38 No 6

Ting, S., Dubelaar, C., Dawson, L., 2005, Factors influencing paradoxes of Technology Adoption and Consumption, ANZMAC Conference 2005

Young, L., and Wilkinson, I., 1989, The role of trust and co-operation in marketing channels: a preliminary study, *European Journal of Marketing*, Vol 23

Zaltman., G., Duncan, R., and Holbeck, J., 1973, *Innovations and Organisations*, New York, Wiley and Sons

Zhaung, Y., and Lederer, A., 2003, An instrument for measuring the business benefits of e-commerce retailing, *International Journal of Electronic Commerce*, 7(3)